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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/848,824	05/19/2004	Yaron Kranz	62976(52398)	4777

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EXAMINER

SCHWARTZ, JORDAN MARC

ART UNIT	PAPER NUMBER
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2873

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11/19/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/848,824	KRANZ ET AL.	
	Examiner	Art Unit	
	Jordan M. Schwartz	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 September 2007.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 52 and 53 is/are allowed.
- 6) Claim(s) 1-3,6-8,14,18-22,31-38,40 and 42-46 is/are rejected.
- 7) Claim(s) 4,5,9-13,15-17,23-30,39,41 and 47-51 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Claim Objections

Claim 20 is objected to because of the following informalities: "to produce said display image" lacks an antecedent basis and it is suggested that it be changed to "to produce a display image". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6-8, 14, 18-22, 31-38, 40, and 42-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato et al.

Sato et al reads on these claims by disclosing the limitations therein including the following: a system for tracking an eye (abstract re "sight line detecting") comprising an image detector (Figure 2, "117", column 4, lines 24-35); a pupil illuminating light source as claimed (Figure 2, "120", column 4, lines 36-41); at least one reference light source to illuminate a portion of a user's face (Figure 2, "115", abstract, column 1, lines 15-26, column 4, lines 14-35); an image processor coupled to the detector to analyze the eye image (Figure 2, "controller"); a portion of the pupil illuminated light is directed to the detector (Figure 2, column 4, lines 36-57); a portion of the reference beam being reflected to the image detector (Figure 2, column 4, lines 8-35); the image processor identifies the pupil and reference region and determines the line of sight according to

both regions (abstract, column 7, lines 52-55); the image processor determining line of sight based on the coordinates of the center of the pupil (abstract, column 7, lines 52-55); an optical relay to receive light from either the pupil illuminating or reference beam and directing the light to the eye (Figure 2 with lens "116" as an "optical relay"); the image processor controlling a light source according to the eye (column 4, line 47 to column 5, line 3); a beam splitter reflecting and transmitting as per claim 7 (Figure 2, "119"). The claimed "mounted on a helmet" goes to the intended use of the eye tracking system. It has been held that that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987). Sato et al further discloses at least one display light source for a display image (Figures 2 and 13 i.e. the system is viewed through a display and any of the light sources providing illumination can be considered as the display light source ; the display image and reference light beams collimated (Figure 2, column 4, lines 14-23 re illuminating the eye as a substantially parallel beam); a portion of the reference light source aligned with the optical axis of the display light source (Figure 2); the recognizable portion of the face as the cornea (column 1, lines 15-27); directing the pupil illuminate light beam first toward the eye and then toward the image detector (Figure 2); and directing the reference light beam first toward the face of the user and then toward the image detector (Figure 2).

Prior Art Citations

Japanese document number 2001-61785, Amir et al publication number 2003/0098954, Ohtani patent number 6,507,702, Kohayakawa patent number 5,889,577, Suzuki patent number 5,491,532 are being cited herein to show references that would have read on or made obvious a number of the above rejected claims, however, such rejections would have been repetitive.

Ben-Ari et al patent number 6,667,694 (cited on applicant's IDS) would have made obvious (as a teaching reference) a number of the above rejected claims, however, such rejections would have been repetitive.

Allowable Subject Matter

Claims 4-5, 9-13, 15-17, 23-30, 39, 41, 47-51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 52-53 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: with respect to the allowable subject matter, none of the prior art either alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103. Specifically, with reference to claim 4, none of the prior art either alone or in combination disclose or teach of the claimed system for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, the image processor identifies the pupil region as a brighter region when the intensity of ambient light increases and as a darker region when the intensity of ambient light decreases. Specifically, with reference to claim 5,

none of the prior art either alone or in combination disclose or teach of the claimed system for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, an ambient light detector with the image processor controlling a selected one of the at least one pupil illuminated light source to produce a respective pupil illuminated light beam, characterized according to the intensity of the ambient light. Specifically, with reference to claims 9-13, none of the prior art either alone or in combination disclose or teach of the claimed system for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, the system mounted on a helmet comprising a helmet visor with the helmet visor receiving at least one selected light beam of the at least one pupil-illuminated light beam and the reference light beam and the helmet visor at least partially reflecting at least one selected light beam toward the eye. Specifically, with reference to claim 15, none of the prior art either alone or in combination disclose or teach of the claimed system for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, a display light source displaying a target marking respective of a selected target, around the selected target, and a weapon system is actuated when the target marking substantially matches the line of sight. Specifically, with reference to claims 16 and 30, none of the prior art either alone or in combination disclose or teach of the claimed system for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, the image processor further analyzing the movement of the eye in response to at least one stimulating light beam, thereby examining user reflexes.

Specifically, with reference to claim 17, none of the prior art either alone or in combination disclose or teach of the claimed system for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, the image processor registers a logical display element from the display image with the field of view of the user. Specifically, with reference to claims 23 and 41, none of the prior art either alone or in combination disclose or teach of the claimed system or method for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, the recognizable portion of the face as the eyelids. Specifically, with reference to claims 24-29 and 47-49, none of the prior art either alone or in combination disclose or teach of the claimed system or method for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, determining a physiological state of the user according to the eye image. Specifically, with reference to claim 39, none of the prior art either alone or in combination disclose or teach of the claimed method for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, further comprising the preliminary procedure of detecting ambient light and at least one of the selected one of the at least one pupil illuminated light beam and at least one reference light beam is produced according to the detected ambient light. Specifically, with reference to claim 50, none of the prior art either alone or in combination disclose or teach of the claimed method for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, statistically analyzing the eye image thereby

determining statistical features of the eye. Specifically, with reference to claim 51, none of the prior art either alone or in combination disclose or teach of the claimed method for tracking the eye of a user specifically including, as the distinguishing feature(s) in combination with the other limitations, identifying a target along the determined line of sight, prompting user confirmation of the target acquisition, receiving user confirmation of the target, and directing a weapon toward the target. Specifically, with reference to claims 52-53, none of the prior art either alone or in combination disclose or teach of the claimed system for directing a weapon toward a target specifically including, as the distinguishing feature(s) in combination with the other limitations, the claimed eye tracker as part of a system that further includes a head position tracker and a vehicle position and orientation tracker, the processor directs a weapon toward the target according to the line of sight, the position of the head, and according to the position and orientation of the vehicle.

Response to Arguments

With respect to the Ashkenazi reference, applicant has provided a Declaration under 37 CFR 1.132 stating that the relevant subject matter disclosed in Ashkenazi originated or was obtained by the applicant's of the present application. Based upon a review of the declaration and a consideration of the totality of the evidence, the rejection by Ashkenazi has been withdrawn.

Applicant's arguments filed September 20, 2007 with respect to the Sato reference have been fully considered but they are not persuasive.

Applicant first argues that Sato does not disclose "at least a portion of the pupil-illuminating light beam aligned with at least a portion of an optical axis of the image detector". Applicant's figure 1 embodiment discloses the pupil-illuminated light beam at "106" and the image detector at "102". The light from the pupil illuminating light beam "106" first travels to the half mirror "104" then to the pupil, then through the half mirror to image detector "102". Applicant's specification does not support the light beam first emitted from "106" as being aligned with the optical axis of "102" but rather the beam from "106" is aligned with the optical axis of "102" after being deflected from the eye and traveling back to the detector. Likewise, in Sato, the beam is first emitted from "120" and after being deflected from the eye, is deflected from the eye to half mirror 119, then deflected by half mirror "114" and reaches the detector "117" (Figure 2, column 4, lines 47-58). Therefore, similar to what is disclosed in applicant's invention, the pupil-illuminated light beam is aligned with the image detector after being deflected by the eye and traveling back to the detector. Sato therefore discloses the pupil illuminated light beam aligned with at least a portion of an optical axis of the image detector in the same manner as the present application.

Applicant additionally argues that Sato does not disclose the illumination beam illuminating the pupil of the eye. The examiner disagrees. Sato discloses beam "120" as plural light beams that surround the eye and illuminate the eye (column 4, lines 36-42). Sato discloses this light beam "for detecting the position of the pupil center" (column 4, lines 36-42) and therefore the light beam will be illuminating at least a portion of the pupil of the eye. Regardless, the light beams "120" of Sato surround the eye to

illuminate the eye and therefore will inherently be illuminating "at least a portion of the pupil of the eye". Furthermore, the examiner does not agree that Figure 5 is disclosing the pupil center as a dark region.

For applicant's information, as cited in the prior office action and as cited again above, since applicant has not amended the independent claims in any manner, numerous references cited above would still read on or make obvious a number of the rejected claims but such rejections would have been repetitive.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jordan M. Schwartz whose telephone number is (571) 272-2337. The examiner can normally be reached on Monday to Friday from 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jordan M. Schwartz
Primary Examiner
Art Unit 2873
November 14, 2007